Maternal and Child Oral Health Interventions in Middle East and North Africa Regions

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Title: Maternal and Child Oral Health Interventions in Middle East and North Africa Regions: a rapid review

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Summary

Objectives: To conduct a rapid review to identify any maternal and/or child oral health interventions implemented and/or tested in Middle East and North Africa (MENA) countries generally, and Lebanon, Palestine and Syria specifically, and to compile information on the relative effectiveness of these.

Methods: A systematic search was conducted for primary and secondary literature indexed in five online databases and the websites of the World Health Organization (WHO), the International Union for Health Promotion and Education (IUHPE), the United Nations Children's Fund (UNICEF), United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) and the United Nations Refugee Agency (UNHCR).

Results: Two independent researchers reviewed 1,180 records from the online databases and 3,120 reports from the WHO, UNRWA, UNICEF and UNCHR. Four unique studies were included and conducted in Syria, Saudi Arabia and Iran. No systematic reviews were found for targeted interventions in MENA regions. However, interventions using fluoridated toothpaste (Syria), preventive treatment and fluoridated chewing gum (Saudi Arabia) and oral health education with oral health reminders (Iran) were significantly effective in reducing early child caries (ECC) experience. In Syria and Iran, mother and child oral health promotion integrated into ongoing vaccination programmes were effective in reducing ECC. These interventions formed part of WHO and Ministry of Health programmes.

Conclusion: Further investigation is essential to verify the effectiveness of incorporating multi-disciplinary, theory driven oral health interventions into ongoing WHO maternal and child health programmes in MENA countries will assist in promoting oral health and wellbeing.

Introduction

Maternal and child oral health in Middle East and North Africa

The vast majority of children and adults worldwide suffer from dental caries [1], and very recent review evidence indicates that the global burden of untreated dental caries is growing [2]. The American Academy of Paediatrics reported that early child caries treatment costs $1,000 to $2,000 per child [3], which is not affordable in Low and Middle Income Countries (LMICs).

Poor oral hygiene, high sugar intake, poor living conditions, limited access to health care services, together with ineffective oral health care programmes enlarge this global public health problem and its negative consequences on vulnerable populations in LMICs [1, 4, 5]. Local and international associations' policies to tackle the global problem of oral diseases are currently limited [6]. This is despite the fact that oral diseases and Non-Communicable Diseases (NCDs) share the same common risk factors [7].

A systematic review showed that there are many risks factors associated with low utilisation of oral health services during pregnancy which increase the risk of having oral diseases, these factors can be socioeconomic, psychological, and behavioural [8]. It is agreed that low economic status, low education level, older age, anxiety, and poor oral hygiene and eating behaviours are associated with high risk of exposure to dental diseases [8, 9]. The high risk of oral disorders during pregnancy does not only increase the risk of having dental caries, oral diseases and low birth weight in new-borns, but it can also cause serious health conditions which may lead to long term negative impacts on mother and child general health and quality of life [10, 11]. Studies in Pakistan indicate that severe periodontal diseases contribute to the high prenatal mortality incidence [12, 13]. Despite a number of studies showing evidence, that the treatment of periodontal diseases during pregnancy, reduces the risks of spontaneous preterm birth and low birth weight [12, 14], the most recent review showed that the evidence that periodontal treatment during pregnancy reduces low birth weight, preterm birth and perinatal mortality [15] is weak. Nonetheless, Figuero and Sanz [16] emphasized that the periodontitis is a potential risk factor for adverse pregnancy outcomes and gestational diabetes mellitus.

Oral health inequality is growing in MENA regions, and this is attributed to problems with accessibility and affordability of essential oral health care, as well as to the adoption and use of

inappropriate and ineffective oral health interventions [4, 6, 17, 18]. Dental health research in MENA regions has tended to focus on oral diseases in children and associated risk factors, whereas similar studies for pregnant women are rare.

Previous surveys carried out in certain countries in the Middle East showed high prevalence rates of caries in primary teeth at the level of 80-85% [19, 20]. The most recent review for obvious caries experience reported in deciduous teeth (dmft) in the Arabic region, exceeding a score of 8 in some countries [21]. In the Palestinian Territories, the prevalence of dental caries in children is high (65.5%) [22, 23] and children in this country are exposed to higher risk of this disease (DMFT=1.98) [24] compared to neighbouring Israeli children (DMFT=1.66) [25]. Approximately, three quarters of Syrian children experience high early childhood caries (dmft= 4.25) and this was significantly associated with bottle feeding during infancy and toddlerhood [26]. In Lebanon, 88% of children with deciduous teeth suffered from dental caries, and 94.4% of dental caries was not treated [27]. Poor toothbrushing routines and limited access to dental care services in addition to high consumption of sugar, and lack of free fluoride toothpaste or fluoride applications [5, 23, 28, 29] lead to plaque accumulation on the teeth and roots surfaces. These countries experience growing political conflicts lead to displacement of a vast number of people to refugees' camps associated with serious deterioration in socio-economic and health condition of non-refugees and refugees living in theses countries[23]. As a result, their Ministries of Health, World Health Organisation clinics and United Nation Relief and Works Agency experience shortages in health care service personnel and facilities to meet the massive health needs of these vulnerable groups[22].

Interventions to improve maternal and children oral health

The WHO Global Burden of Disease initiative aims to inform research for the prevention and control of NCDs in LMICs, and its Maternal, Child and Adolescent Health programme in Geneva [30] have established a toolkit for improving maternal and new-born health at national and international levels.

In parallel, the WHO Antenatal Care Programme's vision is to provide every pregnant woman and new-born infants with essential health care services and build positive pregnancy experience worldwide [31]. Until 2014, 64% of women with a live birth worldwide were provided with intensive antenatal care by the WHO global maternal health programme [31]. In order to improve

the quality and coverage of anti and post-natal health care services, the WHO revealed 49 recommendations for health interventions [31]. Unfortunately, these recommendations do not include any interventions to promote oral and dental health care for mothers and their children.

Most recent reviews, however, report the necessity to develop effective oral health interventions to improve oral and systemic health for both women and their offspring [32]. The FDI World Dental Federation, further, emphasised the importance of integrating oral health in all health policies at national and international levels to prevent oral disease through encouraging governments, stakeholders, and decision-makers to adapt oral health promotion as integral part to general health policies [33]. Varenne [6] declared that the WHO African region is currently aiming to integrate oral health prevention and control with ongoing NCDs intervention to reduce oral health inequalities in African countries.

The effectiveness of incorporating oral health promotion into ongoing WHO mother and child health programmes to reduce caries experience, improve oral hygiene and dietary habits is supported by the results of Abou El Fadl, et al [34] systematic review. This review reported positive outcomes due to integrating promotion of oral health of mothers and children into nursing and midwifery practice [34]. Furthermore, the models to improve mother and child oral health in areas of high deprivation, such as "Childsmile" [35] and Maternal and Early years "Pregnancy Oral Health" programmes [36] in Scotland, could provide lessons that may help to develop effective oral health promotion and address oral health inequalities in communities in LMICs.

Many factors contribute to the increased risk of maternal and child oral diseases in the MENA region as LMICs [37, 38]. In order to plan for effective maternal and child oral health interventions in MENA countries, it is important to know if there are any effective maternal and/or child oral health interventions implemented in the MENA region and to assess the role of local and international health organisations involved in the prevention of oral diseases. This is extremely important for countries such as Lebanon, Palestine and Syria that suffer political unrest which is known to affect the availability and efficacy of such interventions.

Aim and review questions

Aim

This study aimed to conduct a rapid review of the literature to identify any maternal and/or child oral health interventions implemented and/or tested in MENA countries with particular focus upon Lebanon, Palestine and Syria, to compile information on the relative effectiveness of these.

Research questions

The specific research questions for this rapid review were:

1. What maternal and/or child oral health interventions have been implemented and tested in countries in the MENA region?
2. Are there any maternal and/or child oral health promotion interventions integrated into ongoing WHO or government maternal and/or child health programmes available in countries of the MENA region?
3. Are there any systematic reviews or randomized controlled trials assessing the effectiveness of maternal and/or child oral health intervention in MENA countries and if so, what are the most effective interventions?
4. Are there other health care interventions that might provide an opportunity for an oral health 'add-on' or integration?

Method

A rapid review of peer-reviewed publications and grey literature was conducted to identify any maternal and child oral health interventions implemented and /or tested in MENA countries generally, and Lebanon, Palestine and Syria specifically. The rapid review is defined as 'a type of knowledge synthesis in which components of the systematic review process are simplified or omitted to produce information in a short period of time' [39].

This review followed the recommended guidelines for developing rapid reviews [40, 41], and this includes conducting the following steps:

1. Research questions formulation;
2. Developing inclusion and exclusion criteria;
3. Determining the search strategy;
4. Screening: Selecting the literature and study quality assessments;
5. Data extraction;
6. Data synthesis;
7. Data analysis and dissemination of results and recommendations.

Search strategy

A systematic search was conducted for primary and secondary literature searching in the databases (Cochrane library, MEDLINE, Web of knowledge, CINHAL, and Education Resources Information Center (ERIC)) and websites of World Health Organization (WHO), the International Union for Health Promotion and Education (IUHPE), the United Nations Children's Fund (UNICEF), United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) and the United Nations Refugee Agency (UNHCR).

The search included MeSH terms and free text. The keywords which were used in searching databases (Supporting Materials: Table 1) were: Tooth or teeth; Dental caries or dental decay or dental cavity or dental cavities or tooth decay; dmf index; Dental plaque or dental biofilm; Mother or maternal or mum or mom; Pregnant or pregnancy; Parents or parenting or parent; Infant or baby or neonate or newborn; Child or paediatric or pediatric or children; Maternal-Child Health Services; Middle east or Pakistan or south Asia or Syria; North Africa or Maghreb.

No limitations for period or language of studies were specified.

Screening: Selecting the literature and studies quality assessments (Table 1)

Selecting the literature

The following inclusion and exclusion criteria were applied in the selection process:

Inclusion criteria:

1. Population: Mothers and/or children under 5-years-old; and living in MENA countries.
2. Study design: Oral health intervention and/or systematic reviews for oral health intervention.
3. Outcomes: Change in incidence and/or prevalence of oral and dental diseases among mothers and/or children under 5-years-old; and change in personal skills, strengthen community actions, reorienting health services, building healthy public policy and creating supportive environments to improve or promote oral health.

Exclusion criteria:

1. Oral health interventions for children ≥ 5 years old;
2. Mother and/or child oral health intervention which were not conducted in MENA regions;
3. Studies did not report outcome;
4. Non-peer reviewed publications;
5. Non-freely available electronic publications;
6. Thesis, dissertations or book chapters;
7. Publication with no abstracts.

All screening stages were conducted by two independent reviewers (LA and SMcG) and any disagreement on study inclusion between the two reviewers were arbitrated by the third reviewer (RF).

Assessment of Study quality and risk of bias

The methodological quality of included studies was assessed by two independent reviewers and based on reporting guidelines for the relevant study design published by Equator Network, e.g. CONSORT, TREND, Newcastle-Ottawa Scale (NOS) and AMASTAR [42-46]. The quality of Randomised Control Trials was assessed using the 25-item checklist stated in CONSORT

guidelines [44], while Non Randomised Control Trials quality was assessed by the Newcastle-Ottawa Scale (NOS)[46].

Assessment for risk of bias was conducted independently by two reviewers for included interventions based on the criteria identified in the Cochrane Handbook for Systematic Reviews of Interventions [47]. The probability of bias was assessed as high (-), low (+) or unclear (?) for: selection (random sequence generation and allocation concealment), performance (blinding of participants and personnel), detection (blinding of outcome assessment), attrition (incomplete outcome data), reporting (selective reporting) and other bias.

Data extraction

The articles and reports, which met the inclusion criteria were retained for data extraction and further analysis. Table 2 shows the template developed based on WHO recommendations for evaluation of oral health promotion and prevention interventions [48, 49] to answer the review questions and to facilitate the data extraction.

The template allowed the data to be extracted on maternal and/or child oral health interventions or reviews implemented in the MENA countries. The approaches used in these interventions to improve mother and/or child oral health, the measurements of their outcomes, and the integration of these interventions into ongoing maternal and child health programme implemented (if any) in the same country were noted.

Data extraction was developed by two reviewers (LA and SMcG), one reviewer (LA) extracted the data to the template (Table 2) for data extraction and the second reviewer (SMcG) double-checked the extractions by the first reviewer. The final characteristics of the template to extract data in this rapid review was discussed and agreed by the research team.

Data synthesis;

A synthesis of study data pertinent to each of the review questions was performed. The synthesis included the categorisation of relevant study findings. No attempt was made to perform meta-analysis for two reasons: 1) The review was not initially designed to perform such an analysis; 2) the trials included in this review were heterogenous with regard to population, intervention, and comparator.

Data Analysis and dissemination of results and recommendations

A descriptive analytical method was used to present the outcome of the review. Conclusions and recommendations emerged from the findings and gaps identified by this review.

Results

Literature selection and assessment of studies quality and risk of bias

Based on the rapid review search strategy 1,180 records were returned from the databases and 3,120 reports were found in the websites of WHO, UNRWA, UNICEF and UNCHR.

Following screening 32 records were identified as fulfilling the inclusion criteria. Full texts were retrieved for the 32 records and following further detailed scrutiny 26 were subsequently excluded.

PRISMA flow diagram [50] (Figure 1) illustrates the reasons for exclusion of 26 studies from this review. All the nineteen records from the websites of WHO, UNRWA, UNICEF and UNCHR and two studies [51, 52] from database were excluded because they were neither mother and/or child oral health intervention nor reviews for mother and/or child oral health intervention. While, four studies [53-56] were excluded because they were not conducted in MENA regions. One review [57] was excluded because it did not report outcomes related to oral or dental health.

The remaining four articles [58-61] reporting four unique studies fulfilled all inclusion criteria and were included for data extraction. The potential risk of bias was low in the included studies, except for performance bias, as illustrated in Figure 2. In the four of the interventions, participants were not blinded, because of the nature of the interventions.

The four studies showed high methodological quality those were of Joury, et al [59], Mohebbi, et al [60] and Makvandi et al [61] and met most of CONSORT guidelines. The fourth experimental trial of, Alamoudi, et al [58], were awarded eight stars and met the criteria of the three categories (selection, comparability and outcome) identified by the Newcastle-Ottawa Scale (NOS)[46] for the non-randomised trials.

Research question 1: What maternal and/or child oral health interventions have been implemented and tested in countries in the MENA region?

Table 2 shows that the Saudi Arabian clinical trial [58] assessed the effectiveness of xylitol in reducing plaque accumulation, caries activity and salivary Streptococcus Mutans for Saudi mother-child dyads. A further randomised controlled trial [59] in Syria investigated the effectiveness of integrating oral health promotion within national immunisation programme, and another two cluster randomised trials [60, 61] in Iran. Mohebbi et al assessed the effectiveness of integrating child oral health education into general health services in public health centres[60]. While Makvandi et al assessed the impact of multicomponent theory of planned behaviour and oral health education intervention on the mothers' cognitive predictors and behaviour of teeth cleaning of children aged 1-2 years [61]. The duration of the four retained interventions ranged between 3 to 24 months.

Giving Xylitol and oral hygiene instructions with fluoride toothpaste use, dietary counselling and restorative treatment for mothers and children was significantly effective in reducing plaque scores (P=0.002), Salivary Streptococcus Mutans Levels (P= 0.002) in mothers and caries experience in their children in Saudi Arabia [58].

Research Question 2. Are there any maternal and/or child oral health promotion interventions integrated into ongoing WHO or government maternal and/or child health programmes available in countries of the MENA region?

Three mother and child oral health promotion randomised trials [59-61] in Syria and Iran were integrated into on-going vaccination programmes in public health services and child day care centres. In Syria, providing infant oral health pamphlet together with a baby toothbrush, fluoride toothpaste (1,000 mg/L) and a trainer cup by vaccination team without giving any health counselling to the mother, caused a significant decrease in child plaque scores and reduced bottle-feeding practices (P<0.001). The Iranian intervention showed that providing pamphlets on caries prevention only, without additional oral health instructions or reminder phone calls, significantly increased the risk of developing new dental caries in one-year-old children [60].

Makvandi et al found that implementing a multicomponent oral health intervention considering the Theory of Planned Behaviour and providing oral health education sessions, booklet and

mobile phone text massage reminder for three months, significantly (P<0.001) improved mothers' cognitions (knowledge, attitude, and perceived behavioural control) and cleaning of children's teeth.

Research Question 3. Are there any systematic reviews or randomized controlled trials assessing the effectiveness of maternal and/or child oral health intervention in MENA countries and if so, what are the most effective interventions?

Four randomised trials of Alamoudi, et al [58], Joury, et al [59], Mohebbi, et al [60] and Makvandi et al [61] were identified. There were no systematic reviews identified in the search of the literature.

Research Question 4. Are there other health care interventions that might provide an opportunity for an oral health 'add-on' or integration?

Three of the randomised trials [59-61] integrated oral health into on-going vaccination programmes providing evidence for an opportunity for an oral health 'add-on' or integration with public health/or maternal child- health interventions.

Discussion

This rapid review used systematic review methods [62] to identify any mother and/or child oral health intervention that may have been implemented and/or tested in the MENA countries. Despite the fact that, methodological quality assessment is not an essential part for rapid reviews [62], this review used this assessment to help in verifying the evidence for the effectiveness of incorporating mother and child oral health interventions into ongoing NCDs programmes. The methodological quality of the four included interventions in this review were high, which supports the inclusion of maternal and child oral health interventions into national and international policies.

In order to investigate the effectiveness of included interventions, the review evaluated interventions against the WHO recommendations and guideline for evaluation of effectiveness of oral health interventions [48, 49]. The WHO guidelines emphasised on the importance of seeking information clarifying the intervention's objectives and goals, methods (including: design of the intervention, participants, timescale, development and delivery of the intervention, use of standardised clinical measures and most valid outcome measures), outcome evaluating the

effectiveness of oral health promotion and prevention interventions and considering the quality of life for targeted group, and its sustainability through improving behavioural practice, building capacity and enabling the expansion of successful programmes. All these guidelines were met by the included interventions [58-61] in the current review.

This rapid review found no maternal and/or child oral health interventions integrated into ongoing maternal focused health programmes in MENA countries (e.g WHO maternal and child health programme). However, the three randomised trials, which were conducted in Syria [59] and Iran [60, 61], respectively, reported high and significant improvement in infants' and 1-2 year old childrens' oral health when incorporating child oral health promotion programmes into ongoing government vaccination programme and child care centres. These results are supporting by the view of Varenne [6] for the importance of integrating the oral health prevention programmes into non-communicable diseases programmes. However, these interventions [59-61] contacted the mothers when the child was 1 year old and this may have diminished the effectiveness of the interventions and increased the dental caries risk. It worth noting that, these interventions showed significant reduction in plaque and bottle feeding [59]- the early dental caries risks- and Significant (*P=0.001*) improvement in mothers' oral health knowledge, attitude, perceived behavioural, and cleaning of children's teeth [60-61]. These interventions illustrated the importance for using integrated approaches during pregnancy and to continue support behaviour change throughout the infants' first few years. Makvandi et al emphasized on the effective role of phone text reminders on enhancing the positive outcome and improving mothers' cognitions and cleaning of children's teeth [61].

This review suggests that a multi-disciplinary approach considering Theory of Planned Behaviour would improve the success, together with the implementation and delivery of oral health interventions to parents and their children. However, as determined from the Syrian [61] and Iranian [60] interventions which used vaccination staff to deliver the oral health interventions, suggested that health staff in Primary Health Care can help in delivering oral health interventions. Furthermore, a significant improvement in pregnant women oral health knowledge and behaviours was detected, as a result, of interventions implemented in countries of other regions of WHO such as Australia[63] and USA[64], to test the effectiveness of using nurses and midwives staff to improve pregnant women oral health.

These methods were emphasized by Petersen, et al. [49] and Sheiham, et al. [7] who recommended integrating oral health prevention programmes into general health interventions as they share common risk factors which allow non-dental health staff to participate in oral health education programmes. The most recent systematic review [34] provided strong evidence on the capability of nursing and midwives to conduct dental health education and intraoral screening for children and mother during their visits to ongoing health promotion programmes, and the later programmes allowed wide access for most vulnerable groups in most of poor communities in LMICs.

Effective oral health interventions improve oral and systemic health for both women and their children [32]. This review found that incorporating oral health preventive intervention into NCDs interventions will secure a broader access to vulnerable groups who in need to oral health promotion in most LMICs.

Many tools are effective in promoting mother and child oral health whether they are used together or individually. These tools are Xylitol chewing [58], baby toothbrush, fluoride toothpaste (1,000 mg/L) and a trainer cup, providing oral health pamphlets without health workers' counselling [59], oral health pamphlets in combination with oral hygiene instructions, dietary counselling [58, 60, 61], providing restorative treatment [58], and considering extra motivation and reminders for mothers as part of the intervention [60, 61].

The main limitation of the current review is that there are few studies investigating the impact of incorporating of oral health preventive intervention into ongoing WHO or government maternal and/or child health programmes in countries of the MENA region and showed significant improvement in mothers' cognitions and cleaning for children teeth. Thus, the strong evidence of the effectiveness of such interventions is not approved enough and needs more investigation. However, incorporating oral health promotion into ongoing WHO programmes in political unrest areas would contribute in retarding the increase in periodontal and ECC experience in disadvantages and refugees group[23] to reduce the oral health services burden which is not affordable by governmental and WHO health care programmes[22] in these countries.

In conclusion, the incorporation of theory-driven oral health promotion programmes, using for example the Theory of Planned Behaviour, into ongoing WHO antenatal care, global maternal health and child health programmes [31] and empowering nurses, midwives and general health staff with oral health promotion tools and materials will allow for early access, more effective and

broader maternal and child oral health prevention in MENA countries generally, and Lebanon, Palestine and Syria specifically.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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Table 1 screening and selection the literature

Database or related website	Number of Publications		
	From search Strategy	Included After screening for title, abstract and keywords and duplication removal	Included for Full text review
Cochrane library	81	5	4
Medline (EMBASE) Using MeSh System	188	3	
Web of Knowledge	629	3	
CINAHL	39	2	
ERIC	243	0	
WHO website	2900	19	0
UNRWA	65	0	0
UNICEF	11	0	
UNHCR	144	0	0
Total	4300	32	4

Table 2: Template for data extraction

Study	Location	Study Design	Population (Participants)	Intervention	Duration (months)	Comparison	Outcome
Alamoudi et al, 2012	Saudi Arabia	Clinical trial	60 mother & child (2-5y) pairs	**Experimental (n=30)** received: • Xylitol treatment: chewing gum • oral hygiene and dietary instructions, • restorative treatment	24	**Control (n=30)** received: • oral hygiene and dietary instructions, • restorative treatment	• Decrease number of mothers with high mutans streptococcus level in experimental (P= 0.002) and control (P= 0.02) groups. • Decrease in plaque scores (p=0.002) in children (from 0.94 to 0.35). • No significant decrease in dmft and DMFT
Joury et al, 2016	Damascus , Syria	Randomised controlled parallel-group trial Integrated into ongoing Vaccination Programme	92 mothers & infants (1 y) pairs	**Intervention (n=32)** received: • infant oral health pamphlet, • baby toothbrush, fluoride toothpaste (1,000 mg/L) • no counselling.	1	**Control 1 (n=30)** received: • pamphlet only Control 2 (n=30) received: • no intervention	• Decrease in plaque (from 100% to 9.4%) and bottle-feeding practices (from 100% to 18.8%) (P>0.001) among infants in the intervention group • No differences between the two control groups
Mohebbi et al, 2009	Tehran, Iran	Cluster randomised trial Integrated into ongoing Vaccination Programme	242 mothers & children (12-15 months) pairs	**Intervention A (n=77)** received: • pamphlet • 5 min of oral health instructions • phoned twice as reminded **Intervention B (n=85)** received: • no verbal oral health instructions • no reminder phone calls were provided.	6	**Control (n=80)** received: • no oral health information.	• Increase (p 0.05) in mean decayed enamel (de) increment in control (0.4) and intervention B (0.2) groups with No new de appeared in intervention group A (de decreased from 0.25 to 0.0). • Increase percentages of children developing new de were (26, 14, and 0% respectively). • de of intervention group A reduced from 0.25 to 0.0 and percentage of children having dental caries in the same group reduced from 13% to 7%. • No differences in decayed teeth (dt) increments. • Higher number needed to treat (NNT) for intervention group B (9 [1/(0.14–0.0)]) compared to that of intervention group A (4 [1/(0.26–0.0)]).
Makvandi et al, 2015	Hamadan, Iran	Cluster randomised control trial	90 mothers & child (1-2y)	**Intervention** (5 day-care centres, n=40 mothers) received: • 3 oral health sessions • Booklet • SMS reminder	3	**Control** (5 day-care centres, n=41 mothers) received: • no intervention	At 10 days & 3 months assessment, improvement in all cognitions in intervention group was: • Significant (*P=0.001*) in knowledge, attitude, perceived behavioural, and cleaning of children's teeth. • Only knowledge had high effect size (>0.7).

Figure legends

Figure 1: PRISMA flow diagram of numbers of publications at each key stage of the rapid review

Figure 2: Summary of the assessment of risk of bias in the included studies

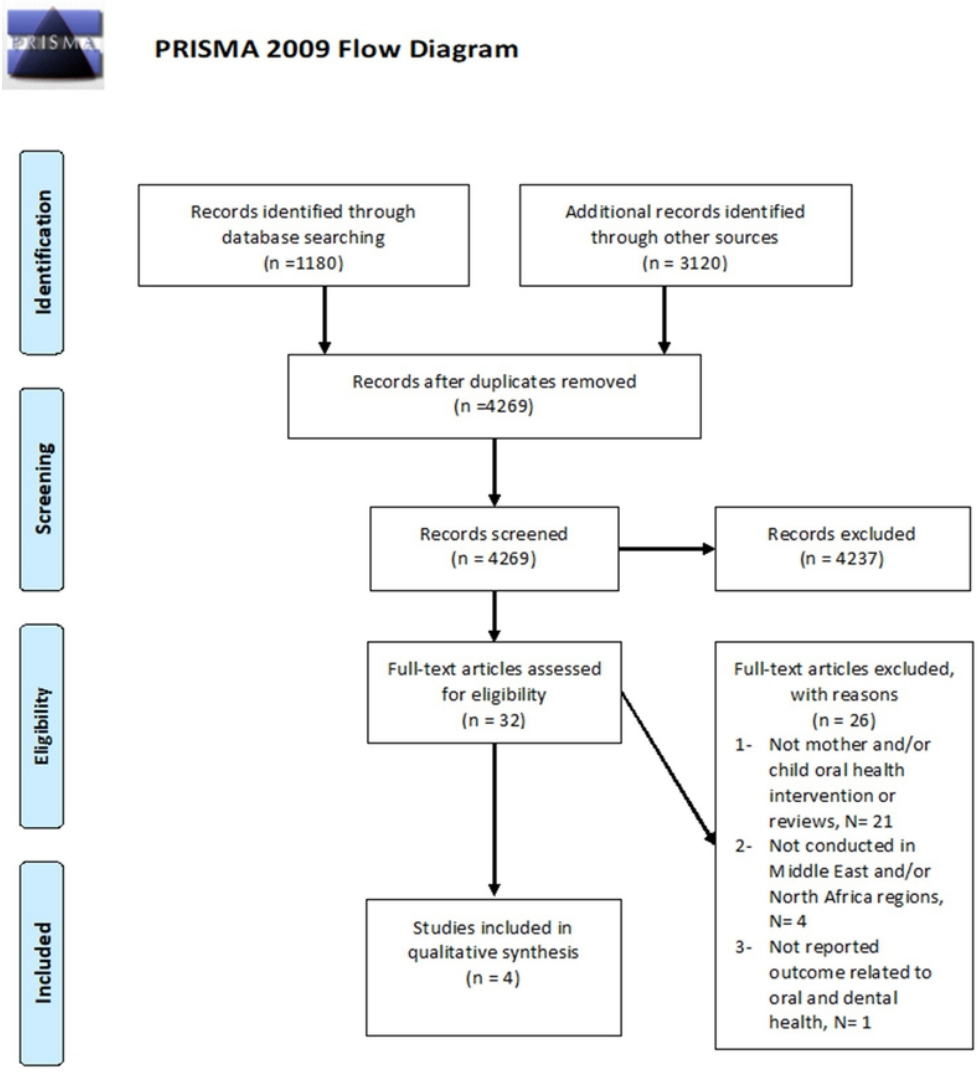

Figure 1: PRISMA flow diagram of numbers of publications at each key stage of the rapid review

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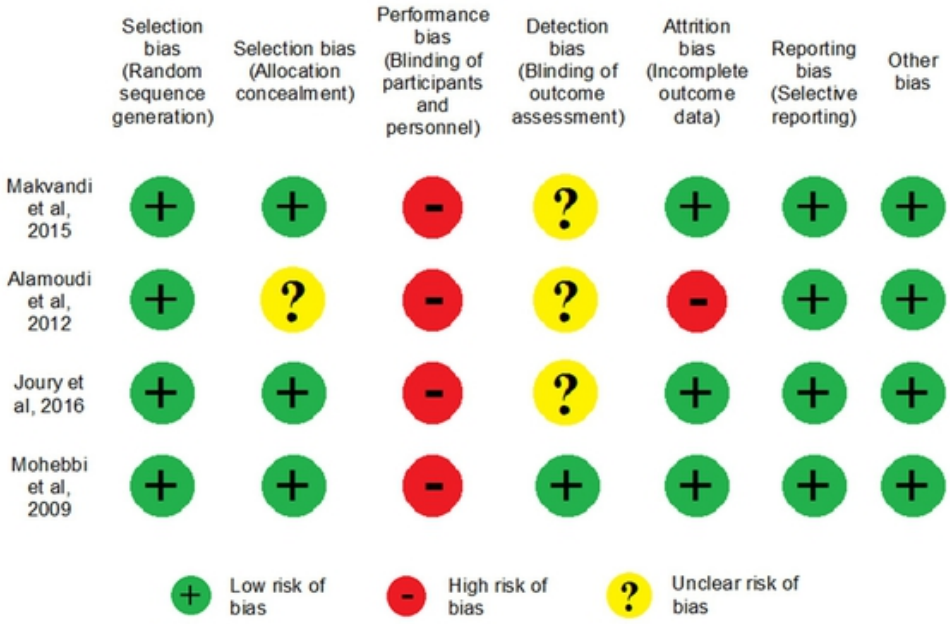

Figure 2: Summary of the assessment of risk of bias in the included studies

49x33mm (300 x 300 DPI)